Livestock

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Overview on livestock policies in the Bedouin area Northwestern coast zone of Egypt

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INTRODUCTION

This chapter describes the main development policies of the Northwestern coast zone (NWCZ) of Egypt, especially those having contributed to the significant changes of the livestock sector from the past decades until today. The main goal is to understand better causes and effects of the successive policies and the main reasons for their implementation. The basis of this chapter is the doctorate thesis of Ibrahim Daoud (2016) which has been written in part as a contribution to the Springer's book entitled *Building resilience of human-natural systems of pastoralism in the developing world: Interdisciplinary perspectives*. We have chosen a chronologic presentation of the main policies, after a short presentation of the area.

DESCRIPTION OF THE NORTHWESTERN COAST ZONE

Located in Western Egypt, NWCZ is a strip of arid land along the Mediterranean coast. It is bounded by the sea to the north, the Nile Valley to the east, the Libyan border to the west and the Sahara desert to the south into which it is integrated (Figure 1). From 1944 to 1995, the average annual rainfall was around 140 millimeters with important annual variations. From 1996 to 2011, a strong 15-year drought seriously impacted rural activities. From an agroecological point of view, especially with regard to water availability, there are three main entities within NWCZ. The first extends about 100 kilometers west of the Nile Delta to the city of Ras El Hekma.

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It benefits from the Nile water brought by Hamman Canal, in reference to the city of Al Hammam located in the western suburbs of the megalopolis that is Alexandria. The second entity extends from the Libyan border to Fuka Village (located between the towns of Salloum and Ras El Hekma) on a distance of about 285 kilometers and 70 kilometers to the south. This area depends on rainfall as the only water resource for agriculture activities, rain-fed and wadi agriculture due to its 218 wadis. The third entity is the Siwa oasis located southwest of NWCZ about 300 kilometers from the Mediterranean coast. The Siwa oasis benefits from water from the deep aquifer of the same name on which it is located.

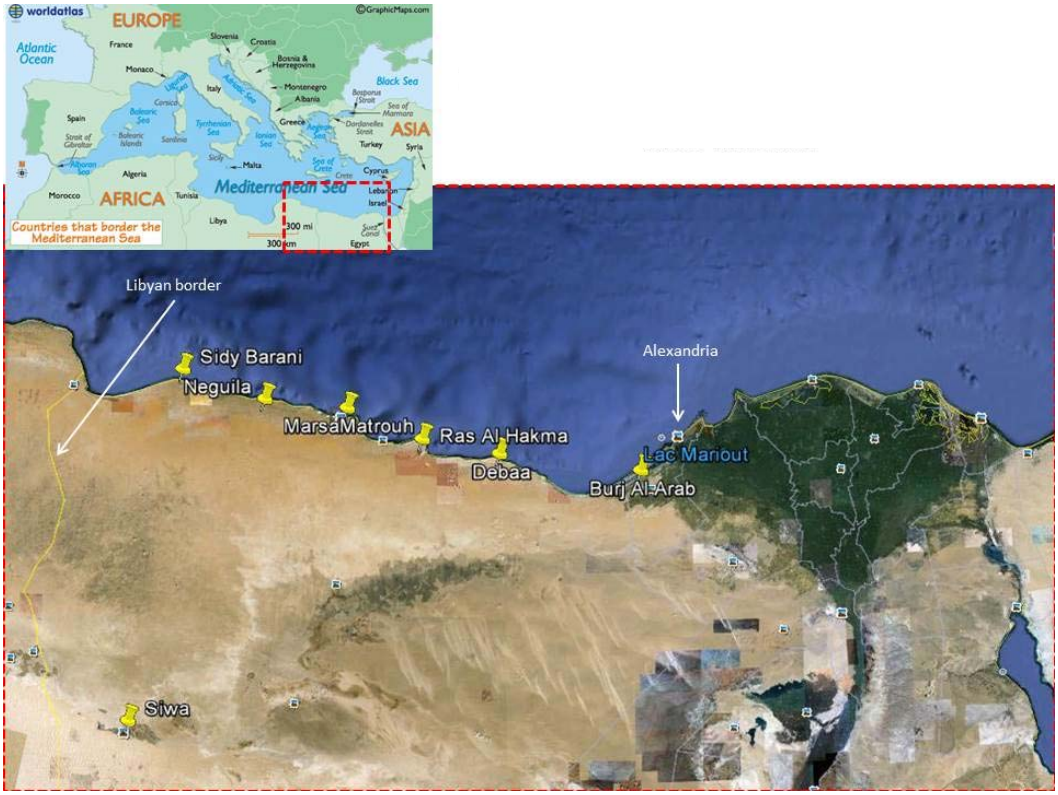

Figure 1: Location of the Northwestern coast zone of Egypt in the Mediterranean and its main urban centers

NWCZ is mainly settled by Bedouins, especially in rural area. According to Daoud (2015), the five main tribes are: Awlad Ali Abiad, Awlad Ali Ahmar, Qutaan, Gomiaat, and Snena. Due to the harsh conditions, Daoud (2015) considered that Bedouin breeders have developed complex pastoral livestock farming systems based on animal husbandry, including sheep, goats and camels, taking into consideration seasonal migrations, some barley fields and a few wadis crops according to their water management. Moreover, the development of sea tourism along the Mediterranean coast over the last decade has strongly impacted NWCZ from a demographic point of view with the seasonal arrival of large contingents of holidaymakers, especially

during the summer and religious days, and from an economic point of view in connection with the supplies needed by holidaymakers.

A LONG TIME AGO UNTIL THE ROMAN PERIOD

According to Daoud (2015), two or three millennia ago, and even earlier, NWCZ was a food-providing area for the entire Mediterranean Basin, both in Roman times and under Greek and Egyptian periods; ancient literature spoke of NWCZ under the names of Mareotis, Mariout, or Marmarica. However, looking at the current landscape, the author wonders how difficult it is to imagine the zone as an important food basket for these antique civilizations. Indeed, it is almost a desert of stones and sand, except for the narrow and arid strip of land located along the coast where the Bedouins benefit from the sea air humidity and short wadis to crop barley, figs and olives. Maybe the climate was different at that time and/or agricultural practices were not sustainable?

Based on a review of the literature, Kassas, cited by Bruins et al. (1986), explains water management in NWCZ. It is a function of the land topography, especially on the coast with its succession of small limestone hills parallel to the coast (Ball, 1952; Said, 1962). The cultivated land lay at the foot of the chains of small hills where rainwater accumulated. According to Daoud (2015), Kassas, cited by Bruins et al. (1986), mentioned that in addition to the advantage offered by this geological opportunity, several types of infrastructures have been built. Among these, the *karm*, inspired by the principle of hillside reservoir, is the most notable. Hume and Hughes (1921), and Cosson (1935) describe the *karm* as a mound a few meters high and a few dozen meters at its base that has a geological or human origin, for example an old building in ruins covered with sand brought by the wind over time. Due to its surface permeability, rainwater penetrates to its base and accumulates, thus constituting a microcollinear reservoir. This ingenious rainwater harvesting system made it possible to grow crops close to houses, complementing the crops in the fields located in the shallows and wadis at the bottom of the hill chains. Another type of infrastructure associated or not with *karms* were the Roman cisterns, some of which are still in use. The small round cisterns were generally located near the *karms* in the ancient villages. They were filled with water collected by the *karms*. Their main purpose was to supply water to the villagers. The large rectangular cisterns dug under large flat stones were close to the fields and were most used during the dry season when the small cisterns had been emptied, especially for watering the herds. They are described by Shata (1953) and El-Miniawy et al. (1990).

The principle of the Roman cistern is a cavity dug into a limestone ridge with a vault that is both rigid and permeable, because made of limestone, it structures the cavity while allowing infiltration water to pass through and fill it. The cavity is lined with clay to prevent loss. Roman cisterns have a capacity of a few hundred cubic meters. The location of one or more tanks is not chosen at random. It corresponds to an area

located downstream of a watershed, with a layer of limestone, or at least limestone slabs that will provide the vault of the cistern. Consequently, the surface area of the watershed determines the capacity and number of cisterns. On the ground of the watershed, small canals can be built to bring runoff water into the cistern through an opening at the top of the cistern. More than 3000 Roman cisterns are said to have been built in NWCZ between Alexandria in the east and Salloum in the west (Shata, 1953) for a total capacity of about two million cubic meters of good quality water (Daoud, 2015). The same author considers that many of these Roman cisterns were still in use at the beginning of the 20th century as an efficient means of collecting and stocking rainwater for humans and animals.

Alongside *karms* and cisterns for domestic water use, including watering herds, Walpole (1932), then Kassas, cited by Bruins et al. (1986), described another original system discovered in 1931 near the present-day town of Marsa Matruh, now the capital of the province. According to these authors cited by Daoud (2015), it is an underground aqueduct, corresponding to the main canal, equipped with a network of galleries perpendicular to the main canal for the collection of infiltration and runoff water. It was used to collect and transport water from one site to another nearly one kilometer away. The dimensions of the canal averaged 2.1 meters depth and 1.1 meter width. It was equipped with 25 access hatches, presumably for maintenance. Its location is no coincidence either. It was built in a limestone ridge bordered by dunes on the seaside and by the rocky plateau on the desert side. The plateau is notched by the canyons of the wadis, which brought water to the aqueduct system.

For Daoud (2015), these different and complementary infrastructures, and certainly many others used still today can explain the importance of NWCZ as a food basket of the antique Roman and Greek empires and before that antic Egypt. Weedon, cited by Bruins et al. (1986), reports that the first record of the decline of Mareotis dates back to AD 950. By the 10th century, the area gradually degraded. The vineyards were replaced by desert. Only a tiny town existed west of Alexandria by AD 1400. Five centuries later, the district was described as covered with ruins of towns and villages, and the cisterns, dating mostly to Greek and Roman times. These brief reminders about the water harvesting techniques in the Roman and Greek period, more than two thousand years ago, show the strong adaptation of NWCZ society to drought conditions.

NOMADS AND THE PASTORAL BEDOUIN SYSTEM - 2ND MILLENNIUM

Regarding the Mareotis decline, Cosson (1935) added that wind, rain, and sand completed the destruction, leaving only the foundations of countless buildings to tell the tale of this once-prosperous land. Some researchers consider this decline could be attributed to climate changing toward dryer conditions (Daoud, 2015). This author cited Cosson (1935) referring to authors justifying the Ostrich extension in the Libyan Desert by a drier climate. Another school (Daoud, 2015) argued that the current

climate in Alexandria and NWCZ was probably not adequate to the intellectual activity in sciences and art during the Roman and Greek period. However, other arguments showed a relative stability of the climate over the past two or three millennia, especially based on the conservation of the materials used for infrastructures (Weedon; cited by Bruins et al., 1986).

Cossom (1935) suggests a plausible hypothesis of the decline of Mariotis. Thus the numerous conflicts linked to the advance of the Fatimid tribes into the area from the west, particularly at the end of the 10th century, may have led the rural population to flee the fighting and migrate to Alexandria where it remained. The abandoned land and agricultural infrastructure gradually deteriorated. During the 11th century, the Mariotis period came to its end with the invasion of Bedouin tribes who settled throughout the region and imposed their pastoral and nomadic way of life for which agriculture and therefore infrastructure maintenance was not a priority. According to Daoud (2015), this would be the most plausible explanation, especially because in the following centuries many other conflict-related migrations took place in NWCZ and neighboring Libyan region.

According to Daoud (2015) based on several authors, community rangeland management at tribe level and the possibility for any breeder family to move in search of the best rangeland to feed camels, sheep and goats formed the basis of the Bedouin pastoral system. Apart from the need to have pasture all year round to feed their herds, the other constraint of the nomadic pastoral system was the watering of people and animals, especially during the long dry season. Due to this constraint, the Roman cisterns and some other watering infrastructures were strategic, even water resources and supply were common in the Bedouin society. Therefore, according to Daoud (2015) the lack of boundaries between tribes imposed by the nomad and pastoral life was possible as long as common pastures and watering resources were sufficient. Due to the weak availability of these resources, the demographic growing Bedouin society progressively adopted boundaries between the tribes. Thus, while continuing to live in tents, which are easier to move than houses, families generally moved around on their tribes' lands, both in the area close to the coast and around Siwa oasis, especially during the dry season, and on those located in the hinterland, where they migrated when the rains arrived, allowing the grass to grow again.

Daoud (2015) describes the nomadic and pastoral Bedouin system using the example of the Aiit Sebak family settled in 1840 in the south of Naghamish wadi near the city of Marsa Matruh, which migrated near Siwa oasis during the summer and fall. The Sebak family had been living in tents when the Egyptian government, in partnership with the World Food Program (1970), started to settle the Bedouin society by building houses. The last tent in Sebak family's area disappeared in 1989. In 1920, land tenure started to appear in the Bedouin area. It is called Al Houz. The Sebak family got land tenure on their land after a hard effort with their neighbors from the other tribes. In the south, the rangeland is still common land because it is rocky and

no oil has been found there. Formalizing the allocation of pasture land – that customary law had allocated to them – to Bedouins can be seen as the first public livestock policy of modern times at NWCZ scale.

FROM THE 1920S TO THE 1960S

Daoud (2015) considers that the official land law did not meet the demand of the Bedouin society, whose customary law was sufficient, especially to resolve local land conflicts. According to this author, the interest came mainly from the national governance, in both Egypt and Libya, which was occupied by Italy at the time. Therefore, better control of the frequent pastoral movements between Egypt and Libya progressively appeared as a priority objective for the Egyptian government.

With the official land law, the land was common only at the level of the tribe. Consequently, no tribe herd could graze anywhere without permission from the land-attributed tribe. This can be considered as the first land constraint to the nomad Bedouin system, because they claimed: "we were depending completely on the rangeland; we were searching pasture anywhere that we can find it; and for that reason we were nomads, moving from place to another, searching pasture; and for that reason the land was common land for a long time."

According to Daoud (2015), based on the talks of the current Omda (leader) of the Gnashat tribe, his grandfather, also Omda of the same tribe, rented in 1925 the northern area of Naghamish wadi from the King of Egypt (Khdiwy Abas). The rent was fixed to the quarter of the wadi production, which should be given or paid to the Egyptian kingdom. Based on the Omda's talks, the Naghamish wadi grew fig trees, barley and wheat, and bred pigeons. Because of an internal tribe conflict in 1972 involving the Konishat tribe and its neighbors, the land was divided between Konishat, Mawalek, and Gbihat tribes.

Daoud (2015) sums up the stakeholders' talks regarding grazing: "The best grazing period during the good years was three or four months from the end of December to March, and sometimes the beginning of April." For the remaining months, there were two choices: to migrate to the desert in the south, especially to Siwa oasis, or to move to Behira Governorate in the east to enable their herds to pasture irrigated fields after harvesting. An important change in the Bedouin migration system occurred during World War II. At the beginning of the war, NWCZ was considered as a possible future battleground because of the Egyptian-Libyan border, attached to British and Italian-German powers, respectively. Therefore, the British Army decided to transfer all the Bedouin tribes to Behira Governorate in order to control and protect them. In consequence, during some years, the movement of the flocks was strongly perturbed. After the 1945 armistice, the Bedouin herds went to pasture in NWCZ. A specific public policy cleaned the Roman cisterns to facilitate the living conditions of the Bedouin breeders coming back to their lands.

The management of sheep and goat flocks and camel herds was the main activity of Bedouin breeders. There were several hundred and up to a thousand head in sheep flocks. According to Daoud (2015) these sizes might have referred to the extended family, including the flocks of different households. Some Bedouin families progressively started to plant barley at this time, some of them before World War II, and the majority after the war. One consequence has been the onset of mechanization and tractors at the end of this period. However, the flocks did not graze in the cultivated fields. Barley grains were only used for making flour and bread. The lambing and kidding occurred only once a year. Except in spring, when the pastures are good in terms of feeding, the sheep and goat flocks were not in a good condition.

However, animal diseases were not serious, even with the migrations, which favored contacts between the herds. At the same time, migrations helped to control parasitism caused, on one hand, by the lesser stock rate on a same pasture and, on the other hand, the sun destructive effect on parasite larvae. Thus, many Bedouins consider that the use of concentrates as feed resources in the 1980s favored the expansion of parasitism, especially pulmonary and digestive, and other sheep and goat diseases.

Regarding the 1950s and the first years of the revolution, it was reported to Daoud (2015) that "specific Egyptian policies aiming to attract the Bedouin families and to enhance the settlement in the Egyptian land" had been launched. This author also cited the example, "Bedouins travelling in NWCZ between Marsa Matruh and Alexandria did not need to have their national IDs any more, NWCZ having been totally integrated as a regular part of the national territory." The author adds that the years after the war were the period of some significant changes in NWCZ in terms of livestock policy and provides some examples.

In 1947, started in Fuka area a research and development project focused on groundwater use to produce alfalfa, locally named *kataf*. Only one year later, in Al Dakhla oasis, Bedouins of the Al Shtor tribe planted fig trees. Moreover, in 1952, the king of Libya, Idriss, decided to build dykes in the Naghamish wadi. The construction started several years later but these initiatives show the interest of the national governance of two nations for the settlement of Bedouin breeders through the development of livestock-cropping systems using irrigation. After the revolution, several other policies were applied in NWCZ, especially related to the new extension services in rural area implemented by President Nasser's government.

In addition, Marsa Matruh considerably grew during this period. According to Daoud (2015), "strategic place during the 2nd World War and, still a major location for the Libyan leaders, the regional capital of NWCZ has progressively become the place where were debated the regional policies, the agreements between the Egyptian government and the Western Bedouin society, and also arrangements with Libyan leaders, considering the same origin of the tribes in the two countries."

FROM THE 1960S TO THE 1990S

According to Daoud (2015), this period started in a complex situation for Egypt. With the end of the monarchy in 1952, the young Republic of Egypt, led by the army, faced the British-French coalition in 1956 to control Suez Canal. At the same time, Israel's army occupied the Egyptian Sinai, another strategic Bedouin area located in the east. The main objective for the Egyptian government regarding NWCZ was to secure the Western border with Libya to avoid another potential conflict in the West and retain the natural resources of the subsoil, especially oil and gas. Therefore, the settlement of NWCZ Bedouin tribes and good relation with Libya were an important part of the strategy, above all the Bedouins had double citizenship, Egyptian and Libyan. Beside the national funds to implement its specific policy for NWCZ, the Egyptian government was supported by the Food and Agriculture Organization of the United Nations (UN FAO), then by the World Food Program (WFP). The Bedouin settlement policy then intensified mainly because of the war between the two nations from 1979 to 1989. Daoud (2015) writes: "Despite all the tensions and conflicts between Libya and Egypt, the relationship between Bedouin breeders from the two sides of the borders was good. Moreover, several tribes were settled in the two countries. Many leaders of Egyptian tribes recognized the Bedouin Libyan leadership, which frequent exchanges between these leaders, several in the city of Marsa Matruh."

Special efforts had already been made with regard to access and communication in NWCZ. Therefore, the railway line and the main road crossing NWCZ, from Alexandria in the east to the Libyan border in the west, were built. There were used a lot during World War II. In consequence, Daoud (2015) considers that the main investments were the maintenance of these infrastructures and building new ones, especially the secondary roads used by the Bedouin population to gain access to their communities. At the same time, new schools and public health centers were built not only in Marsa Matruh City, but also in the main small towns and villages where Bedouins had recently settled.

According to Daoud (2015), beside the public infrastructure-building program in NWCZ, since the 1980s, the Egyptian government, along with FAO and WFP support, strengthened its policy to improve local life conditions. Bedouin breeders received long-term and free-interest loans either for housing, or for breeding and crops, especially barley, figs and olives. They also received seeds, fertilizers, access to equipment such as tractors for tillage. However, the harvest was manual. Today they are harvested by machine or manually.

Beyond the adoption of cropping activities, a direct impact of the crop development has been the beginning of land division at family scale (*beat*). It primarily concerned the crop land located near and around the villages, often planted with barley and orchards. This fragmentation of the crop land at family level has strongly changed

crop land management. From this period on, each family has managed its fields located near its home. According to Daoud (2015), "Until today, the main part of the rangeland is still a common land at the tribe level and has not been yet divided between the families of the tribes."

At the same time, other policies focused on livestock, most important Bedouin activity in terms of income. They especially promoted the building of cooperatives and associations. According to the stakeholders (Daoud, 2015), "The policies through the cooperatives' system were centralized but the decisions were local in each village." Via these associations and cooperatives, breeders benefited from low-cost inputs for breeding, especially drugs and later had access to animal feed, such as concentrates and more recently hay. Daoud adds that one of the key informants estimated the feeding subsidies at 40% of the production cost in the 1990s. For example, a breeder who needed around 250 Egyptian pounds (EGP) to produce a lamb received a subsidy of EGP 100. The same informant estimated the total subsidies at 750 million EGP in 1990, i.e. in todays' money around 4–8 billion EGP.

At the end of the 1980s, specific policies were launched to export sheep to the Gulf countries. Public agencies in charge of the export programs supported the breeders in terms of management, especially genetic improvement and feeding in order to enhance NWCZ livestock potential. According to Daoud (2015), it was the beginning of a strong partnership between cooperatives of breeders and public agencies, especially academic institutions, research centers and extension services.

During the same period, in particular during President Sadat's government, tourism began developing in NWCZ, notably in the east near the Nile Delta, with four touristic sites within 25 kilometers from Alexandria, and in the city of Marsa Matruh. Daoud (2015) notes "The tourism progressively expanded in the deltas of the wadis, where it settled on the most fertile agricultural soils, planted with fig and olive trees." Facing the demand of land for tourism construction, some breeders sold small pieces of their land to private businesses. This had not been possible during Nasser's period, because they did not own the official title of their land. Daoud (2015) cites: "Land competition was still the great challenge in NWCZ, due to the only three types of legal landownership recognized by the Egyptian law: private ownership, cooperative ownership, state ownership." Based on this text, the tribal or common land ownership did not exist. The rangeland, called desert land, was classified as *aradi bur*, meaning undeveloped or rain-fed lands, giving rights and ownership to the Egyptian State (*malkiya lil-dawla*). Therefore, only the Egyptian State could use these lands, lease them, even sell them. In consequence, the Egyptian government used a lot of this text to develop through irrigation the rural land near Alexandria. Only some Bedouins, who were previously settled in this area, benefited from irrigated small plots. Except for this area, in the main part of NWCZ, large pieces of land, even crop land, were attributed to the army for strategic reasons, justifiably or not.

In conclusion, for this period, specific services and policies were launched in order to facilitate the activities and living conditions of Bedouin breeders' families and tribes. However, the land continued to be the central issue of the successive military governments, notably for security and mutual enrichment of both the country and army leaders. The presence of official army land in traditional Bedouin land poses a real problem that persists today.

FROM THE 1990S UNTIL THE PRESENT

According to several stakeholders reported by Daoud (2015), two main factors changed the situation in NWCZ between 1990 and 2010. The first was the change of priority during the Mubarak government policies, compared to the 1980s, with notably the end of many direct supports and special actions focused on the Bedouin society. The second was the 15 years' drought from 1995, "partially compensated by the implementation of the Matruh Resources Management Project (MRMP), financed in partnership with international development agencies" (Daoud, 2015).

During these 15 years, the annual rainfall did not exceed 140 millimeters. Based on reports of diverse local Bedouin stakeholders, especially those from the Aiit Sebak family, Daoud (2015) sums up the drought harshness and its impacts on the life of Bedouins breeders: "Until 1995, the rangeland was a natural vegetation cover. The size of the livestock was several hundred to some thousand head. The main job of the members of the family was sheep, goat, and camel breeding, in addition to cultivating barley in depressions. After this date the drought started in the area. The desertification and rangeland degradation also started. The rain stopped completely. The Southern dry wind attacked the rangeland. The vegetation cover had been progressively damaged, reduced year after year, until disappearing completely. Therefore, the soil became more vulnerable to erosion. This bad process continued for 15 years." The result is incredible: today there is no soil; it is just sand and bare rocks.

Two and up to five years' droughts are frequent in NWCZ. Therefore, the natural resilience of the rangeland ecosystem and the pastoral livestock systems allowed the breeders to face these droughts. They recovered the following years when weather conditions improved. With the 15-year drought, the socioecosystem has been deeply affected. All the breeders used the livestock to survive. The sales of animals, especially old males and culled females, enabled them to purchase feed for the herds. In fact, hay and concentrates purchased from markets became the basis of the feeding system during 7-8 months in the rainy years, and for a longer period in the drier years, mainly during summer and fall. In consequence, after this 15-year drought, the largest flocks counted no more than one or two hundred head. For many breeders' families, particularly those with a small herd, the only alternative had been to find another source of income. Therefore, most of the small breeders became traders, and yearned to continue their farming activities. Others migrated,

to Libya or Gulf countries to find jobs, often as shepherds, but also to urban areas as unqualified workers.

Adopting crop-livestock systems was also a strategy for many breeders, expanding their barley areas, and letting their herds graze the fields when the low rainfall did not allow any production of grains. Today, barley is grown around villages, in rangelands which are not available for grazing in winter and spring. Daoud (2015) mentioned conflicts caused by this new crop-livestock land use.

According to Daoud (2015), other breeders decided to invest their labor in wadi crops, planting fig and olive trees, barley and vegetables; "However, the available area is not sufficient to satisfy all the breeders' demand in wadi land," despite the huge investment of MRMP in water infrastructure in the wadis. Fortunately, several land conflicts were resolved at tribe level, "enhancing the importance of the tribe in the local dynamics."

Furthermore, some breeders have decided to invest in intensive and not frequent livestock activities in NWCZ, e.g. indoor sheep fattening and intensive poultry production (Alary et al., 2014). But these new systems require funds for the initial investment and/or good connections, especially to be inserted in the complex market and supply chains of these productions (Daoud, 2015).

Regarding specific policies to support breeders' families who faced the severe drought, a previously mentioned key-initiative was the Matrouh Resource Management Project. According to Daoud (2015), MRMP was an integrated development project that aimed to improve the living conditions of Bedouin communities settled in Western NWCZ, from Fuka to the Libyan border where are located most of the wadis. Because of the 15-year drought in the area, MRMP gave priority to water harvesting and water supply through specific infrastructures for human and animal watering and crop use, especially cisterns in the communities, dams and dykes in the bed of wadis. Several actions, focused on research, research development and extension, were developed by MRMP in diverse sectors, e.g. wadi and rain-fed crops, rangeland, product enhancement, education, public health. More recently, MRMP became a special program of the Desert Research Center (DRC), in partnership with international financial agencies. Through these actions, it has significantly contributed to maintain Bedouin farmers in rural areas. However, the access to wadi land has not been sufficient to cover the Bedouin's demand.

Furthermore, during this period, tourism expansion continued in NWCZ, increasing its effects on land use and the food market. Therefore, beside these effects, they offered job opportunities to qualified youth in the services or non-qualified labor in the building sector. Moreover, they have induced a new lifestyle,particularly for the families "who decided to live in the urban area and for the kids who are growing in the urban area" (Daoud, 2015).

CONCLUDING REMARKS

This chapter presents a brief review of the major changes in NWCZ from the Antiquity until now, mainly induced by policies or development programs. This zone has known regular conflicts with successive settlements involving special policies with regard to the importance of the zone in the region, not only the land but also the soil and natural resources. During the last century, successive governments undertook to settle the local population, even nomads, in order to control better the area, as was the case of the British Army during World War II, then the Egyptian Kingdom, followed by the Egyptian Arab Republic. Other special policies linked to water supply and management were launched in order to improve life conditions and avoid conflicts with local populations. There was a strategic role of international centers and programs in order to support both the government policy and local populations. In parallel, top-down policies were based on the stakeholders' demand considering the area role and importance at national scale, especially regarding border issues.

The main policy regarding livestock has been in fact a rangeland policy until a land policy was implemented by the successive governments to secure the land and its resources facing threats from neighboring countries, particularly Libya. In other words, the life conditions of the populations in pastoral areas have not been the main factors of the policy demand, they were only an argument presented by development projects implemented by national and international centers and ordered by local governments. Fortunately, the effects of these projects have been well received by the local populations, but they could be much more efficient without any other government interest. Furthermore, the tribe is the Bedouin network acting in all layers of the society. The tribe level appears as the key point of sustainable rangeland management. Moreover, land is a major conflict issue in the Bedouin society of NWCZ due to the history of the zone, its strategic location, the weakness of natural resources, especially water, etc. Except in the New Reclaimed Lands and around the wadis, land tenure and land ownership have not been a big challenge yet, but could become one in the near future depending on the land demand, particularly in suburban areas, due to the development of tourism, etc.

At least the current sociopolitical situation, linked to the Egyptian and Libyan revolutions, is building a new context in which no clear perspective can be identified. Face to these social constraints, agronomic and technical issues appear essential to recuperate the rangeland and implement sustainable management. However, they have to be studied, and the beginning involves reviewing the literature and conducting experiments in similar ecosystems.

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